

CLAIMS

1. A communications network comprising:

a pair of network elements;

two or more working spans coupled between said pair of network

elements for carrying communications traffic between said pair of network elements, each working span carrying said communications traffic over a

plurality of channels associated with one or more rings;

a shared protection span coupled between said network elements, said

shared protection span providing a plurality of channels;

wherein said network elements include circuitry for concurrently

switching communication traffic on rings associated with different working spans to respective channels of said shared protection span.

2. The communications network of claim 1 wherein at least one of

said working spans carries traffic for multiple ring structures.

3. The communications network of claim 1 wherein said pair of

network elements each includes a non-blocking optical matrix.

4. The communications network of claim 3 wherein each of said pair

of network elements is coupled to two or more incoming working spans and two or more corresponding incoming protection spans.

5. The communications network of claim 4 wherein each of said pair

of network elements includes control circuitry for switching a channel from each of said incoming protection spans to an available channel of said shared

protection span.

6. The communications network of claim 5 wherein said control

circuitry further is operable to switch a channel from each of said incoming working spans to said shared protection span.

7. The communications network of claim 4 wherein each of said pair
of network elements includes control circuitry for switching a channel from said
shared protection span to a channel on an outgoing protection span.

8. A method of communication information in a communications
network, comprising the steps of:

passing communications traffic between a pair of network elements,
where the pair of network elements are coupled by two or more working spans
each carrying communications traffic between the pair of network elements over
a plurality of channels associated with one or more rings and by a shared
protection span supporting a plurality of channels over which communication
traffic may be passed;

in the event of failures in channels associated with two or more rings
associated with different working spans, concurrently transferring
communication traffic associated with each of said two or more rings over said
shared protection span.

9. The method of claim 8 wherein said step of passing
communications traffic between said pair of network elements includes the step
of passing communications traffic over two or more working spans, where at
least one of said working spans carries communications traffic for at multiple
ring structures.

10. The method of claim 8 wherein said concurrently transferring step
comprises the step of transferring communications traffic through a non-
blocking optical matrix to said shared protection span.

11. The method of claim 8 wherein said concurrently transferring step
includes the step of receiving communications traffic from a plurality of
incoming protection spans.

12. The method of claim 11 and further comprising the step of
transmitting communications traffic from said shared protection span to two or
more outgoing protection spans.

13. A network element comprising:
interface circuitry for coupling to two or more incoming working spans
and two or more respective incoming protection spans, each of said working
spans operable to carry communications traffic over a plurality of channels
associated with one or more rings; and
switching circuitry for concurrently coupling channels from different
incoming protection spans to a shared protection span.

14. The network element of claim 13 wherein said switching circuitry
includes control circuitry for selective switching a channel from an incoming
protection span to an available channel on said shared protection span
responsive to control information.

15. The network element of claim 14 wherein said switching circuitry
further includes a non-blocking optical matrix.

16. The network element of claim 13 wherein said interface circuitry
includes a channel demultiplexer.

17. The network element of claim 16 wherein said interface circuitry
further includes a channel multiplexer.

18. The network element of claim 17 wherein said interface circuitry
includes input/output shelves coupled to said demultiplexer and said
multiplexer.